

# Marysa M. Laguë, PhD

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MAILING ADDRESS: 307 McCone Hall  
Department of Earth & Planetary Science  
University of California  
Berkeley, CA 94720-4767  
PHONE: 1-206-326-0510  
EMAIL: [mlague@berkeley.edu](mailto:mlague@berkeley.edu)  
WEBSITE: [marysalague.com](http://marysalague.com)

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## Research Interests

Land-atmosphere interactions. Climate dynamics. Earth system modeling & idealized modeling. Land use impacts on the climate system. Atmospheric feedbacks. Vegetation impacts on the hydrologic cycle.

## Current Position

2019-PRESENT **James S. McDonnell Foundation Postdoctoral Fellow in Dynamic and Multiscale Systems**  
University of California, Berkeley  
Department of Earth & Planetary Science  
Host: Dr. William Boos

## Education

- 2019 PhD, Atmospheric Sciences  
**University of Washington**  
*Seattle, WA, USA*  
Department of Atmospheric Sciences  
Advisor: Dr. Abigail Swann  
Supervisory committee: Abigail Swann, Gordon Bonan, Cecilia Bitz, David Battisti, Dargan Frierson, Gerard Roe  
Dissertation: *Quantifying the role of individual surface properties on atmospheric feedbacks and land-atmosphere interactions*
- 2018 MSc, Applied Mathematics  
**University of Washington**  
*Seattle, WA, USA*
- 2016 MSc, Atmospheric Sciences  
**University of Washington**  
*Seattle, WA, USA*  
Thesis: *Progressive Mid-latitude Afforestation: Local and Remote Climate Impacts in the Framework of Two Coupled Earth System Models*
- 2013 BSc, Honours Mathematics  
**University of British Columbia**  
*Vancouver, BC, Canada*

## Publications

C. M. Zarakas\*, A. L. S. Swann, **M. M. Laguë**, K. C. Armour, J. T. Randeron. Plant Physiology Increases the Magnitude and Spread of the Transient Climate Response in CMIP6 Earth System Models. *In Press. Journal of Climate*, 2020. EarthArXiv Preprint EMGXB.

**\*Graduate student co-advised by M. M. Laguë & A. L. S. Swann**

J. Kim\*, **M. M. Laguë**, S. Pennypacker, E. Dawson\*, A. L. S. Swann. Evaporative Resistance is of Equal Importance as Surface Albedo in High Latitude Surface Temperatures Due to Cloud Feedbacks. *Geophysical Research Letters*, 47. e2019GL085663 DOI: 10.1029/2019GL085663. EarthArXiv Preprint S5M4U.

**\*Undergraduate student co-advised by M. M. Laguë & A. L. S. Swann**

**M. M. Laguë** Quantifying the role of individual surface properties in atmospheric feedbacks and land-atmosphere interactions. University of Washington. 2019. ProQuest PhD Dissertation.

**M. M. Laguë**, G. B. Bonan, and A. L. S. Swann. Separating the impact of individual land surface properties on the terrestrial surface energy budget in both the coupled and un-coupled land-atmosphere system. *J. Climate*, 32, 5725-5744, 2019. <https://doi.org/10.1175/JCLI-D-18-0812.1>.

A. L. S. Swann, **M. M. Laguë**, E. S. Garcia, J. P. Field, D. D. Breshears, D. J. P. Moore, S. R. Saleska, S. C. Stark, J. C. Villegas, D. J. Law, and D. M. Minor. Continental-scale consequences of tree die-offs in North America: identifying where forest loss matters most. *Environmental Research Letters*, 13(5): 55014, 2018. DOI: 10.1088/1748-9326/aaba0f.

**M. M. Laguë** and A. L. S. Swann. Progressive Mid-latitude Afforestation: Impacts on Clouds, Global Energy Transport, and Precipitation. *Journal of Climate*, 29(15):5561?-5573, 2016. DOI: 10.1175/JCLI-D-15-0748.1.

**M. Laguë**, N. Tania, J. Heath, and L. Edelstein-Keshet. The effects of facilitation and competition on group foraging in patches. *Journal of Theoretical Biology*, 310:88?96, 2012. ISSN 00225193. DOI: 10.1016/j.jtbi.2012.06.024.

## Publications Submitted

**M. M. Laguë**, M. Pietschnig, S. Ragen, T. Smith, W. Kang, D. S. Battisti. Northland: the climate of an Earth with a hemispheric continent. *Under Review, Journal of Climate*, 2020. EarthArXiv Preprint QJNE3.

A. J. Rushby, A. L. Shields, E. T. Wolf, **M. M. Laguë**, A. Burgasser. The Effect of Land-Albedo Feedback on the Climate of Land-Dominated Planets in the TRAPPIST-1 System. *In Revision, The Astrophysical Journal*, 2020.

F. Tromboni, J. Liu, E. Ziaco, D. Breshears, K. Thompson, W. Dodds, K. Dahlin, E. La Rue, J. Thorp, Andrés Viña, **M. M. Laguë**, A. Maasri, H. Yang, S. Chandra, S. Fei. Macrosystems as metacoupled human and natural systems. *In Revision, Frontiers in Ecology*, 2020.

L. Boysen, V. Brovkin, J. Pongratz, D. Lawrence, N. Vuichard, P. Peylin, S. Liddicoat, M. Lo, **M. M. Laguë**, D. Lawrence, T. Hajima, Y. Zhang, M. Rocher, C. Delire, V. Arora, A. Jones, L. Nieradzic, P. Anothni, W. Thiery. Global climate response to idealized deforestation in CMIP6 models. *Submitted. Biogeosciences*, 2020

López-Hoffman, L., A. M. Lien, A.L.S. Swann, X. Feng, T. Huang, D. D. Breshears, J. J. Derbridge, E. Baldwin, **M.M. Laguë**, M. M. Núñez-Regueiro, and J. Soto, Where forest die-off matters for agriculture elsewhere: identifying the hidden economic telecouplings caused by ecoclimate teleconnections. (*In revision*).

## Completed manuscripts awaiting co-author feedback

Copies of these manuscripts can be provided upon request.

**M. M. Laguë**, G. B. Bonan, ..., A. L. S. Swann. Separating the effect of historical vegetation change into the effects of albedo, bowen ratio, and vegetation heigh changes. *To be submitted Summer 2020.*

**M. M. Laguë**, W. R. Boos, A. L. S. Swann. Impacts of individual land surface properties on large-scale atmospheric energy transport, Part 1: forcings, feedbacks, and the ITCZ *To be submitted Summer 2020.*

## Publications in Preparation

**M. M. Laguë**, W. R. Boos, A. L. S. Swann. Impacts of individual land surface properties on large-scale atmospheric energy transport, Part 2: asymmetric circulation responses *To be submitted Summer 2020.*

## Honours and Awards

**Bold** entries indicate awards from National or International competitions.

- 2019            **Community Earth System Model 2019 Graduate Student Award, *National Center for Atmospheric Research.***    <http://www.cesm.ucar.edu/about/awards/2019.html>
- 2018-present   **James S. McDonnell Foundation Postdoctoral Fellowship in Understanding Dynamic and Multi-scale Systems (Active Fellow from Fall 2019 - present)**
- 2016-2019      **National Science and Engineering Research Council of Canada Postgraduate Studies Doctoral Fellowship**
- 2018            Andrew Slater Award for best student or postdoc presentation (Land Model Working Group Meeting), *National Center for Atmospheric Research*
- 2017            Husky 100 Award, *University of Washington*
- 2017            3<sup>rd</sup> Place, Peter B. Wagner Memorial Award for Women in Atmospheric Sciences
- 2016            Advanced Studies Program (ASP) Visiting Graduate Student Award, *National Center for Atmospheric Research*
- 2013-2014      **National Science and Engineering Research Council of Canada Alexander Graham Bell Canadian Graduate Studies Fellowship/Postgraduate Studies Fellowship**
- 2013            Rotary Youth Leadership Award, *Rotary International, District 5080*
- 2011            Undergraduate Student Research Award (Dept. of Mathematics), *University of British Columbia*
- 2009-2012      Chancellor's Scholarship, *University of British Columbia*
- 2010            Trek Excellence Scholarship, *University of British Columbia*
- 2009            President's Scholarship, *University of British Columbia*
- 2009            Columbia Power Corporation Scholarship
- 2009            Chevron Canada/Molnar Bursary
- 2008            Premier's Excellence Award, Government of British Columbia (for the top graduating high school students in the province)
- 2008            BC Innovation Council / BC Science Teachers' Association Award
- 2008            Cranbrook Lion's Club Scholarship
- 2008            Tembec University Studies Scholarship

2008	Dogwood District/Authority Award
2008	Scholastic Distinction Scholarship (College of the Rockies)
2008	Joanne McWhirter/Helton Scholarship for Physics
2008	British Columbia Provincial Scholarship Award
2008	Top Academic Graduate Award, Mount Baker Senior Secondary

## Presentations

<i>Invited Talk</i>	Stanford University CLimate, Atmosphere and Ocean Dynamics (CLAOD) Seminar <i>Stanford, CA, USA</i>	2020
<i>Poster</i>	Berkeley Atmospheric Sciences Center (BASC) Symposium, <i>Berkeley, CA, USA</i>	2020
<i>Poster</i>	American Geophysical Union Fall Meeting, <i>San Francisco, CA, USA</i>	2019
<i>Invited Talk</i>	Department of Earth & Climate Science Distinguished Speaker Series, San Francisco State University, <i>San Francisco, CA, USA</i>	2019
<i>Invited Instructor</i>	Advanced Climate Dynamics Courses (ACDC, 2 lectures), <i>Yosemite, CA, USA</i>	2019
<i>Invited Talk</i>	Aspen Global Change Institute Land Use Meeting, <i>Snowmass, CO, USA</i>	2019
<i>Invited Talk</i>	24th Annual Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Boulder, CO, USA</i>	2019
<i>Invited Talk</i>	Seminar, Department of Earth & Planetary Science, University of California, Berkeley, <i>Berkeley, CA, USA</i>	2019
<i>Invited Talk</i>	Seminar, Department of Earth System Science, University of California, Irvine, <i>Irvine, CA, USA</i>	2019
<i>Invited Talk</i>	Climate & Global Dynamics Seminar, National Center for Atmospheric Research, <i>Boulder, CO, USA</i>	2019
<i>Invited Talk</i>	American Geophysical Union Fall Meeting, <i>Washington, D.C., USA</i>	2018
<i>Talk</i>	Advanced Climate Dynamics Courses Summer School, <i>Finse, Norway</i>	2018
<i>Talk</i>	23rd Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Boulder, CO</i>	2018
<i>Talk</i>	UW Program on Climate Change Spring Symposium, University of Washington, <i>Seattle, WA</i>	2018
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2018
<i>Poster</i>	National Science Foundation Macrosystems Biology PI Meeting, <i>Washington, DC</i>	2018
<i>Talk</i>	American Geophysical Union Fall Meeting, <i>New Orleans, LA</i>	2017
<i>Invited Talk</i>	Ecological Society of America Annual Meeting, <i>Portland, OR</i>	2017
<i>Talk</i>	Atmospheric Climate and Dynamics Seminar, UW Dept. of Atmospheric Sciences, <i>Seattle, WA</i>	2017
<i>2 Talks</i>	22nd Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Boulder, CO</i>	2017
<i>Talk</i>	UW Program on Climate Change Spring Symposium, University of Washington, <i>Seattle, WA</i>	2017
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2017
<i>Poster</i>	10th Annual Graduate Climate Conference, <i>Pack Forest, WA</i>	2016

<i>Invited Talk</i>	National Oceanographic and Atmospheric Administration (NOAA), <i>Boulder, CO</i>	2016
<i>Talk</i>	21st Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Breckenridge, CO</i>	2016
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2016
<i>Talk</i>	American Geophysical Union Fall Meeting, <i>Seattle, WA</i>	2015
<i>Talk</i>	Master's Defense, University of Washington, <i>San Francisco, CA</i>	2015
<i>Poster</i>	9th Annual Graduate Climate Conference, <i>Woods Hole, MA</i>	2015
<i>Talk</i>	Graduate Student Seminar, Program on Climate Change, University of Washington, <i>Seattle, WA</i>	2015
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2015
<i>Talk</i>	8th Annual Graduate Climate Conference, <i>Pack Forest, WA</i>	2014
<i>Talk</i>	Undergraduate Student Research Award Seminar, University of British Columbia, <i>Vancouver, BC, Canada</i>	2012
<i>Poster</i>	Applied Mathematics Perspectives Mathematical Biology Workshop, University of Victoria, <i>Victoria, BC, Canada</i>	2012

### Co-authored Presentations

<i>Poster</i>	American Geophysical Union Fall Meeting: "How Much Does Plants' Response to Elevated CO <sub>2</sub> Influence the Transient Climate Response? " by C. Zarakas, <b>M. M. Laguë</b> , J. T. Randerson, K. Armour, A. L. S. Swann. <i>San Francisco, CA, USA</i>	2019
<i>Talk</i>	American Geophysical Union Fall Meeting: "Can land management alter ecoclimate teleconnections across North America in the face of forest die-off? " by X. Feng, Abigail L. S. Swann, D. D. Breshears, <b>M. M. Laguë</b> , J. P. Field, D. Law, A. Lien, T. Huang, J. Debridge, E. Baldwin, J. R. Soto, L. Lopez-Hoffman. <i>San Francisco, CA, USA</i>	2019
<i>Talk</i>	American Geophysical Union Fall Meeting: "Can land management alter ecoclimate teleconnections across North America in the face of forest die-off? " by X. Feng, Abigail L. S. Swann, D. D. Breshears, <b>M. M. Laguë</b> , J. P. Field, D. Law, A. Lien, T. Huang, J. Debridge, E. Baldwin, J. R. Soto, L. Lopez-Hoffman. <i>San Francisco, CA, USA</i>	2019
<i>Talk</i>	The Future of Earth System Modeling: Biosphere and Land Surfaces (Caltech) "Flexible Complexity as a Tool for Understanding the Role of Land in the Earth System" by Abigail L. S. Swann, <b>M. M. Laguë</b> , G. B. Bonan. <i>Pasadena, CA, USA</i>	2018
<i>Talk</i>	American Geophysical Union Fall Meeting: "Continental-scale consequences of tree die-offs in North America" by Abigail L. S. Swann, <b>M. M. Laguë</b> , E. S. Garcia, J. P. Field, D. D. Breshears, D. J. P. Moore, S. R. Saleska, S. C. Stark, J. C. Villegas, D. Law, D. Minor. <i>Washington, DC, USA</i>	2018
<i>Talk</i>	American Geophysical Union Fall Meeting: "Quantifying the role that terrestrial ecosystems play in Earth's climate" by Abigail L. S. Swann, <b>M. M. Laguë</b> , M. Kovenock. <i>Washington, DC, USA</i>	2018
<i>Poster</i>	American Geophysical Union Fall Meeting: "Evaporative Resistance Equally Important as Albedo in High Latitudes Due to Cloud Feedbacks" by J. Kim, <b>M. M. Laguë</b> , E. J. Dawson, A. L. S. Swann. <i>Washington, DC, USA</i>	2018
<i>Poster</i>	NSF Macrosystems Biology PI Meeting: "Ecoclimate Teleconnections" by A. L. S. Swann, <b>M. M. Laguë*</b> , E. S. Garcia, D. D. Breshears*, J. P. Field, D. J. P. Moore, S. R. Saleska, S. C. Stark, J. C. Villeas, D. J. Law, D. M. Minor. <i>Washington, DC, USA</i> *Presenting Authors. Note: this entry is co-listed in "Presentations"	2018

- Talk* American Geophysical Union Fall Meeting: “Does climate care about land?” by E. J. Dawson, **M. M. Laguë**, A. L. S. Swann. *New Orleans, LA, USA* 2017
- Talk* American Geophysical Union Fall Meeting: “Predicting Tree Mortality Die-off Events Associated with Hotter Drought and Assessing Their Global Consequences via Ecoclimate Teleconnections” by D. D. Breshears, C. D. Allen, N. G. McDowell, H. D. Adams, M. Barnes, G. Barron-Gafford, J. B. Bradford, N. Cobb, J. P. Field, R. Froend, J. B. Fontaine, E. S. Garcia, G. E. St. J. Hardy, T. E. Huxman, J. Kala, **M. M. Laguë**, A. Martinez-Yrizar, G. Matusick, D. M. Minor, D. J. P. Moore, M. Ng, K. X. Ruthrof, S. R. Saleska, S. C. Stark, A. L. S. Swann, J. C. Villegas, A. P. Williams, C. Zou. *New Orleans, LA, USA* 2017

## Teaching Experience

- 2019 ADVANCED CLIMATE DYNAMICS COURSES (ACDC) SUMMER SCHOOL, YOSEMITE, CA  
**Invited Lecturer:** Summer school theme: “The Anthropocene”. *Lectured on land-atmosphere interactions, climate controls on vegetation distributions, vegetation impacts on atmospheric processes, historical vegetation change, projections of future vegetation change, and how vegetation may interact differently with the climate under higher CO<sub>2</sub>; discussed vegetation-atmosphere-climate interactions in the field.*
- 2017-2019 UNIVERSITY OF WASHINGTON, SEATTLE, WA  
**Guest Lecturer:** *Advanced Physical Climatology* (graduate); *Ecological Climatology* (undergraduate/graduate); *Exploring the Atmospheric Sciences* (undergraduate)
- 2016 NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, CO  
**Instructor:** *CLM Tutorial - “Modifying the code in CLM” lecture; practical sessions.*
- 2014 UNIVERSITY OF WASHINGTON, SEATTLE, WA  
**Teaching Assistant:** *Global Warming: Understanding the Issues* (undergraduate)
- 2012 UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER, BC  
**Teaching Assistant:** *Differential Calculus* (undergraduate)

## Grant Reviewer for:

National Science Foundation

2019, 2020

## Journal Reviewer for:

Science  
 Nature  
 Nature Climate Change  
 Journal of Climate  
 Journal of Geophysical Research - Atmospheres  
 Geoscientific Model Development  
 Geophysical Research Letters  
 Journal of Hydrometeorology

## Service & Outreach

- 2019 Instructor for the Advanced Climate Dynamics Courses summer school, *Yosemite, CA*
- 2014-2019 Girls in Science outreach program, Burke Museum of Natural History, *Seattle, WA*

- 2017-2019 Mentoring undergraduate & early graduate students in Atmospheric Science, *Seattle, WA*
- 2016-2019 Outreach activities with the UW Department of Atmospheric Sciences, *Seattle, WA*
- 2016-2019 Diversity and Inclusion Group, Department of Atmospheric Sciences, University of Washington, *Seattle, WA*
- 2016-2018 Founding member of the Program on Climate Change Graduate Student Steering Committee, University of Washington, *Seattle, WA*
- 2016 Chair of the 10th Annual Graduate Climate Conference (GCC10) Organizing Committee, *Seattle, WA*
- 2016 Community Land Model (CLM) 2016 Tutorial instructor, *Boulder, CO*
- 2016-2017 University of Washington Program on Climate Change Graduate Student Steering Committee (founding member), *Seattle, WA*
- 2010-2012 Undergraduate Mathematics Volunteer Tutoring, *Vancouver, BC, Canada*
- 2012 East Kootenay Regional Science Fair Judge, *Cranbrook, BC, Canada*

## Programming Languages

PYTHON, MATLAB, FORTRAN 90, MAPLE, TCSH

## Conferences & Workshops

- 2020 More Effective Communication when Using Video Conferencing Technology, Santa Fe Institute *Virtually / Santa Fe, NM*
- 2020 Grant Getting, Santa Fe Institute *Virtually / Santa Fe, NM*
- 2020 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2020 Pathways to Scientific Teaching Workshop, University of California, Berkeley *Berkeley, CA*
- 2020 Berkeley Atmospheric Sciences Colloquium (BASC) Symposium, *Berkeley, CA*
- 2019 American Geophysical Union (AGU) Fall Meeting, *San Francisco, CA*
- 2019 Workshop on Entrenchment: "The Point of No Return", Santa Fe Institute, *Santa Fe, NM*
- 2019 "The Anthropocene", Instructor at the Advanced Climate Dynamics Courses (ACDC) Summer School, *Yosemite, CA*
- 2019 Impacts of Land Use and Land Management on Earth System Evolution, Biogeochemical Cycles, Extremes and Inter-Sectoral Dynamics, Aspen Global Change Institute, *Aspen, CO*
- 2019 Postdocs in Complexity Conference VI, Santa Fe Institute, *Santa Fe, NM*
- 2019 24th Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2019 Postdocs in Complexity Conference V, Santa Fe Institute, *Santa Fe, NM*
- 2019 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2018 American Geophysical Union (AGU) Fall Meeting, *Washington, DC*
- 2018 Advanced Climate Dynamics Courses (ACDC) Summer School, *Finse, Norway*
- 2018 23rd Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2018 UW Program on Climate Change Spring Symposium, University of Washington, *Seattle, WA*
- 2018 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*

- 2018 National Science Foundation Macrosystems Biology PI Meeting, *Washington, DC*
- 2017 American Geophysical Union (AGU) Fall Meeting, *New Orleans, LA*
- 2017 Stand Up for Science: Graduate Student Advocacy Training (Union of Concerned Scientists Workshop), *Seattle, WA*
- 2017 Ecological Society of America Annual Meeting, *Portland, OR*
- 2017 22nd Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2017 UW Program on Climate Change Spring Symposium, University of Washington, *Seattle, WA*
- 2017 CESM Land Model Working Group Winter Meeting, *Boulder, CO*
- 2017 American Meteorological Society Annual Meeting, *Seattle, WA*
- 2016 10th Annual Graduate Climate Conference, *Pack Forest, WA*
- 2016 21st Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2016 Ecosystem Demographics in the Earth System Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2016 Land Model Working Group Winter Meeting & Joint CESM Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2015 American Geophysical Union (AGU) Fall Meeting, *San Francisco, CA*
- 2015 9th Annual Graduate Climate Conference, *Woods Hole, MA*
- 2015 Aosta Alpine Summer School, Course XXIII: Land-Atmosphere Interactions, Institute of Atmospheric Sciences and Climate (ISAC) – CRN (Turin, Italy) & the Centre national de la recherche scientifique (CNRS) – (France), *Valsavarenche, Aosta Valley, Italy*
- 2015 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2014 8th Annual Graduate Climate Conference, *Pack Forest, WA*
- 2014 Community Land Model (CLM) Tutorial, National Center for Atmospheric Research, *Boulder, CO*
- 2011 Pacific Institute for the Mathematical Sciences - Applied Mathematics Perspectives Mathematical Biology Workshop, University of Victoria, *Victoria, BC, Canada*